EEE

NEWS LETTER

December 2016

VOLUME NO 4 ISSUE 4

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Hi Buddies...

''The Secret of getting Ahead is getting Started..!

A **New Year** is a New Start and way to go. The way of Success is the way of Continuous pursuit of Knowledge. New Year is always so magnificent time of our life, it's when we celebrate the new upcoming year and say good bye to the previous *year 2016*. Let us all welcome the coming *New Year 2017* with open hearts and remember all the moments in our lives.

The month January is best known for the great Indian Monk famous for his precious quotes and his services towards humanity**. "The idea of creation or change is inseparably connected with will"** said by our famous priest **Swami Vivekananda**. This is the time of great changes. The student today, as an individual is a real person with feelings of self-respect, sensitivity, responsibility and compassion.

We need to recognize, appreciate, applaud and foster the fine blend of sensibilities in a student – and thus **this Newsletter** issue is to be viewed as a launch pad for the student's creative urges to blossom naturally. This humble initiative is to set the budding minds free allowing them to roam free in the realm of imagination and experience to create a world of innovation in words. The latest News letter is furnished with best articles and achievements of our students during the previous year.

I thank the Principal, Head of the Department, editorial board, students and teachers who have been of immense help in breathing life into these pages. Thank you readers for your complete support. Hope to hear from you..!!

Happy reading..!!!

By

*** Ms. N.SelvaKarthika***

Final EEE-B

CONTENTS

STAFF ACTIVITIES/PUBLICATIONS/ACHIEVEMENTS

ACTIVITIES:

S.No.	Name of the Staff	Events/Guest Lecture	Topic/Event	Date	College
1.	Dr.R.V.Maheswari, Asso. Prof(SG)/EEE	Guest Lecture/ Faculty Development Program	Control System and its Applications using MATLAB	09.12.2016	Kalasalingam University, Krishnakoil
2.	Mr.M.P.E.Rajamani, AP(SG)/EEE	Guest Lecture/ 7 Days FDTP	Power Converters FET DC Drives	16.12.2016	Francis Xavier Engineering College, Tirunelveli
3.	Mr.A.Pandiyarajan, AP/EEE	ISTE Sponsored Two days Seminar	Power Electronics converter for smart grid functionality using MATLAB	29.07.2016 & 30.07.2016	KLN College of Engineering and Technology
4.	Mr.G.Kannayeram, AP(SG)/EEE	Inter Disciplinary Short Term Course	ICT Solutions for Issues and Challenges in Smart Grid Technology	28th Nov – 2nd Dec 2016	Pondicherry Engineering College, Puducherry
5.	Ms.A.Tamilarasi, AP/EEE	Faculty Development Program	Embedded Systems – For a Connected Tomorrow	14.11.2016 to 19.11.2016	Sastra University, Thanjavur
6.	Mr.J.Sivadasan, AP(SG) Mr.B.Venkatasamy, Mrs.K.Gowthami& Mr.F.AntonyJefrryVaz AP/EEE	Two Days Hands on Training	Embedded System Design using ARM7 LPC2148	02.12.2016 & 03.12.2016	National Engineering College, Kovilpatti
7.	Dr.M.Ravindran, Asso.Prof(SG)/EEE	Two Weeks FDP	Entrepreneurship	05.12.2016 to 17.12.2016	National Engineering College, Kovilpatti
8.	Mr.M.P.E.Rajamani&Mr. S.Sankarakumar AP(SG)/EEE	QIP Short Term Course	Pulse Width Modulation Techniques for Voltage source Converter	21.11.2016 to 25.11.2016	Indian Institute of Science, Bangalore
9.	Mr.M.Gengaraj&Mr.M.Sivapalanirajan AP/EEE	Two Days Workshop	Hardware in the Loop Simulation for Power Electronics and Control Application using LABVIEW	16.12.2016 & 17.12.2016	MepcoSchlenk Engineering College, Sivakasi

10.	Mr.M.Bakrutheen, Mr.B.Vigneshwaran& Mr.Kumar, AP AP/EEE	QIP Short Term Course	Recent Advance in UHV/EHV Transmission and Distribution	19.12.2016 to 23.12.2016	Indian Institute of Science, Bangalore
11.	Mrs.S.Jayanthi& Mrs.G.Shunmuga Lakshmi AP/EEE	Three Days Training Program	Electrical Safety Testing	21.12.2016 to 23.12.2016	MepcoSchlenk Engineering College, Sivakasi

FUNDED PROJECT

Mr.M.P.E.Rajamani(PI) Dr.P.Subburaj(CPI)	*Real time implementation of PID controller for single phase buck boost power factor correction converter using Evolutionary computation*	Research	UGC	4,45,000	2016-2018

PUBLICATIONS:

✓ ***N. B. Prakash***, *G. R. Hemalakshmi and M. Stella Inba Mary*, "Automated grading of diabetic retinopathy stages in fundus images using SVM classifier", Journal of Chemical and Pharmaceutical Research, 2016, 8(1):537-541

✓ ***M. Bakrutheen, M. Willjuice Iruthayarajan and S. Senthil Kumar,*** "Investigation on the properties of natural esters blended with mineral oil and pyrolysis oil as liquid insulation for high voltage transformers", *Intelligent and Electrical Efficient System*, ICIEES'17 – Springer (Accepted for Publications)

✓ ***A. Pandiyarajan & T.Sivakumar,*** *"Electric Arc furnace voltage flicker alleviation by unified power quality conditioner using PSCAD/EMTDC, International Conference on control, instrumentation, communication and computational intelligent, 2016 – IEEE Conference* (Accepted for Publications)

DEPARTMENT ACTIVITIES

EEE ASSOCIATION - ACTIVITIES
BASICS OF MATLAB

. A workshop on **"BASICS OF MATLAB"** was conducted on 03.12.2016 by ***Mr.K.Kumar, Assistant Professor/EEE*** at New Computer Centre was organized by EEE Association. The objectives of the session are:

• Basics about MATLAB Software
• How to do mathematical & logical operation using MATLAB coding
• How to rectify the errors while executing the MATLAB coding

SEND OFF PARTY

A Farewell party was organized to ***Ms.P.Subathra and Ms.D.Kavitha*** by the department on 31.10.2016. They were relieved from the college on their request. All the staffs wished him good luck for their future.

POWER AND ENERGY SYSTEMS

The SIG of 'Power system and Energy' on the topic of 'Evolution of control algorithm used in DSTATCOM' was held on 03/12/2016 at H1 hall of EEE department. It was handled by ***Mr.B.Sahul Hameed AP/EEE***. He gave an introduction about use of DSTATCOM in the distribution system. And the discussion on solutions to the power quality problems such as voltage regulation, reactive power compensation, power factor correction and elimination of harmonics in the distribution system with linear and nonlinear loads had been done.

The impact of control algorithms that is used in DSTATCOM had been discussed. Control algorithms such as phase shift control, p-q theory, hysteresis control and adaptive filtering control algorithm (LMS) had been discussed in detail. And how the control signals are generated and the pros and cons of each control algorithms had also been discussed.

HIGH VOLTAGE ENGINEERING

The objectives of the session are:

• To understand the need for insulation system for power transformers
• Discuss the basic properties of insulating materials
• To survey the recent ongoing research/ challenges in high voltage engineering
• Use of COMSOL Software package
• Breakdown mechanism in solid mechanism

Session I- (10.30 AM – 11.30 AM)

A brief introduction about "Comparison of various vegetable oils and testing" was given by ***Mr.P.Samuel Pakianathan, APEEE***. Then he explained about,

- Basic need for the testing of insulating materials
- Various properties like BDV, Viscosity, flash point, fire point, pH, Conductivity
- Methodologies used for testing of the liquid insulating materials
- Ongoing research works in liquid dielectrics

Session II- (11.30 AM – 12.30 PM)

A brief introduction about "Design of Solid Dielectrics using COMSOL Package" was given by *Mr.B.Vigneshwaran, Assistant professor/EEE*. Then he explained about, need and applications of solid dielectrics and its breakdown mechanism in high voltage engineering. Then he discussed the insulator and its performance during polluted conditions and enlightens the use of COMSOL software for designing solid dielectrics.

SOCIAL AWARENESS CELL

- *Dr.M.Willjuice Iruthayarajan, Prof & Head,*
Dr.M.Ravindran, Asso. Prof(SG),
Mr.N.B.Prakash, Asso. Prof &
Mr.K.Kumar, AP

As a part of Social Awareness cell of EEE department an awareness camp was conducted for *Duraisamypuram* village peoples on 30.12.2016 in the topic "Electricity usage, conservation and safety". The session was started by *Mr.K.Kumar, AP/EEE* with the importance of energy conservation. He told that energy conservation is unquestionably of great importance to all of us since we rely on energy for everything we do every single day. Energy supplies are limited and, to maintain a good quality of life, we must find ways to use energy wisely and without energy conservation, the world will deplete its natural resources. Then he explains the importance of renewable over non renewable energy resources as renewable energies generate from natural sources that can be replaced over a relatively short time scale and he listed out the pros of using renewable energy as follows,

Following the session Mr.Subburaj explains the safety tips to be followed while handling electricity. He pointed out the rules as,

- Disconnect the power source before servicing or repairing electrical equipment.
- Use only tools and equipment with non-conducting handles when working on electrical devices.
- Never handle electrical equipment when hands, feet, or body are wet or perspiring, or when standing on a wet floor etc.

Finally the lateral entry students of third and final year gave presentation about electricity generation from renewable sources and show video demonstration on electricity generation and safety methods. They also put a drama on the theme "electricity conservation". The session was coordinated by *Dr.M.Ravindran, Asso. Prof(SG)/EEE, Mr.N.B.Prakash, Asso.Prof/EEE, Mr.Subburaj* along with lateral entry and NCC volunteers. Around 50 members attend the program and got benefited.

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Online Materials – Apart From Book

NPTEL / MIT / EDX

NPTEL provides E-learning through online Web and Video courses in Engineering, Science and humanities streams. The mission of NPTEL is to enhance the quality of engineering education in the country by providing **free online courseware.**

COURSE NAME	WEBSITE LINK
Second Year	
AC Rotating Machines	**http://nptel.ac.in/courses/108106072/** presented by Prof. P. Sasidhara Rao, Prof. G. Sridhara Rao & Dr. Krishna Vasudevan, IIT Madras
Control Engineering	**http://nptel.ac.in/courses/108102043/** presented by Prof. Madan Gopal, IIT Delhi **http://textofvideo.nptel.iitm.ac.in/video.php?courseId=108101037**presented by Prof.S.D.Agashe, IIT Bombay **http://textofvideo.nptel.iitm.ac.in/video.php?courseId=108102043**presented by Prof.M.Gopal, IIT Delhi. **http://ocw.mit.edu/resources/res-6-010-electronic-feedback-systems-spring-2013/course-videos/**
Electrical Power Systems	**http://nptel.ac.in/courses/108105067/** presented by Prof. A.K.Sinha, IIT Kharagpur **http://nptel.ac.in/courses/117101056/** presented by Prof. R.K. Shevgaonkar, IIT Bombay **http://nptel.ac.in/courses/108104052/** presented by Dr. S.N. Singh, IIT Kanpur

Placement Details

On behalf of the Chairman, Managing Director, Director, Principal, Head of the Department and staff members, we heartily congratulates the final year students who placed in *M/s. Caliber Interconnect Solution Private Ltd., Coimbatore* Campus drive in our campus during the month of December 2016.

- ***Total No. of Students Placed: 04Nos.***

M/s. Caliber Interconnect Solution Private Ltd., Coimbatore

| *Mr. Lakshmana Balakrishanan.R* | *Mr. Madasamy @ Yuvaraja.K* | *Mr. Rama Subramaniam.A* | *Mr. Saravanakumar.G* |

CONGRATS!!!!!

"Be the Change that you wish to see in the World"

APTITUDE TRICKS – C PROGRAM

- *R.Bavithra (Final EEE)*

1. void main()

```
{
int i=0, j=1, k=2, m;
    m = i++ || j++ || k++;
printf("%d %d %d %d", m, i, j, k);
}
```

***ANS*: 1 1 2 2**

In an expression involving || operator, evaluation takes place from left to right and will be stopped if one of its components evaluates to true(a non zero value).

2. #include<stdio.h>

```
#define int char
void main()
{
int i = 65;
printf("sizeof(i)=%d", sizeof(i));
}
```

ANS: sizeof(i)=1

the **#define** replaces the string **int** by the macro **char**.So, here **i** is a variable of type char and not int.

3. #include<stdio.h>

```
#define square(x) x*x
void main()
{
int i;
i = 64/square(4);
printf("%d", i);
```

```
}
```

ANS: **64**

The macro call square(4) will be substituted by 4*4 so the expression becomes i = 64/4*4 . Since / and * has equal priority and associativity left to right, so the expression will be evaluated as (64/4)*4 i.e. 16*4 = 64.

4. **#include<stdio.h>**

```
#define a 10
void main()
{
#define a 50
printf("%d", a);
}
```

ANS: 50

The preprocessor directives can be redefined anywhere in the program. So the most recently assigned value will be taken.

5. **#include<stdio.h>**

```
void main()
{
int y=10;
if(y++>9 && y++!=11 && y++>11)
printf("%d", y);
else
printf("%d", y);
}
```

ANS: **12**

Since the second condition is false so, further conditions will not be checked, it will be skipped

TIME TO KNOW OUR ALUMNI

Mr. VASANTHA KUMAR MORAIS B

Batch: 2003

*Senior Electrical Engineer – Design
(Oil and Gas Sector), CPPE - Abudhabi,
United Arab Emirates,*

PROFILE SUMMARY

Present Company:

Working as a Senior Electrical Engineer in China Petroleum Pipeline Engineering – Abudhabi division, UAE from August 2016 to till date.

Previous Companies:

- ✓ Wood Group Kenny Ltd. (Oil and Gas division) – Abudhabi – From March 2016 to July 2016
- ✓ Zakum Development Company (ZADCO) –ADNOC group – Abudhabi – From June 2014 to Feb 2016
- ✓ Mott Macdonald L.L.C (Oil and Gas Division) – Abudhabi , UAE – From Jan 2007 to May 2014
- ✓ GEE BEE VEES (BPCL contractor), Tuticorin, India – From May 2003 to Dec 2006

Experience Gained:

Having 13+ years of diversified working experience in electrical system design of different industrial projects for oil and gas onshore plants and offshore platforms. Experienced in conceptual studies, basic design (FEED), detailed engineering projects (EPC), Equipment commissioning and Project Management Consultancy (PMC) service in various oil and gas fields. Have good knowledge on International codes and standards related to oil and gas sectors. Leading various onshore and offshore projects design.

Personality to Know

The Honorable Sir **Claude Elwood Shannon** was an American mathematician, electrical engineer and cryptographer.He was called as the father of information technology.Shannon is noted for having founded information theory with a landmark paper, A Mathematical Theory of Communication that he published in 1948. Perhaps he is equally well known for founding digital circuit design theory in 1937, when, as a 21-year-old master's degree student at the Massachusetts Institute of Technology (MIT), further he wrote his thesis demonstrating that electrical applications of Boolean algebra could construct any logical, numerical relationship.
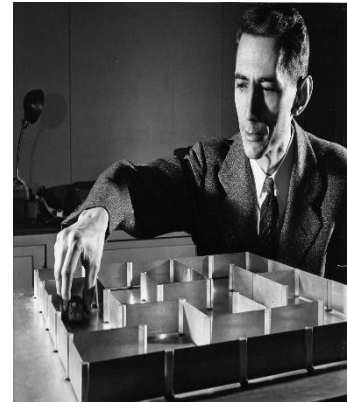
Shannon was born on 30th April 1916 at Petoskey, Michigan and he was grown up in Gaylord, Michigan. He was graduated from public school at Gaylord in the year of 1932. He was more interested in the subject of science and mathematics, and he had made real time experiences with construction of devices like models of planes, radio-controlled model boat and a wireless telegraph system. While growing up, he also worked under Andrew Coltrey as a messenger for the Western Union Company. Shannon's childhood inspiration was Sir Thomas Edison. In 1932, Shannon entered the University of Michigan, where he took a course that introduced him to the work of George Boole. He graduated in 1936 with two bachelor's degrees, in electrical engineering and mathematics. In 1936, Shannon began his graduate studies in electrical engineering at MIT, where he worked on Vannevar Bush's differential analyzer, an early analog computer. In 1937, he wrote his master's degree thesis, A Symbolic Analysis of Relay and Switching Circuits, A paper from this thesis was published in 1938. In this work, Shannon proved that his switching circuits could be used to simplify the arrangement of the electromechanical relays that were used then in telephone call routing switches.

Using this property of electrical switches to implement logic is the fundamental concept that underlies all electronic digital computers. Shannon's work became the foundation of digital circuit design, as it became widely known in the electrical engineering community during and after World War II. The theoretical rigor of Shannon's work superseded the ad hoc methods that had prevailed previously. Shannon received his Ph.D. degree from MIT in 1940. Later he joined at National Research Fellow at the Institute for Advanced Study in Princeton, New Jersey, were he was credited for invention of signal-flow graphs, in 1942. Further his contribution towards the cryptology and information technology adds many feathers to his cap. Sir Claude Elwood Shannon was died on 2001.

K. Madasamy@Yuvaraja,

Final year EEE

Virtual Lab – For this Semester Curriculum

- *S. GanapathyVinayagam, Final Year EEE*

The Virtual Laboratory is an interactive environment for creating and conducting simulated experiments. It is a heterogeneous distributed problem solving environment that enables a group of researchers located around the world to work together on a common set of projects. This virtual lab is used to provide remote access to labs in various disciplines of Science and Engineering. Now we see the labs available in the field of Electrical Engineering which include electrical machines lab, power electronics lab, control system lab, etc.

VIRTUAL ELECTRICAL MACHINES LABS:

	IIT-GUWAHATI	http://iitg.vlab.co.in/?sub=61&brch=168
	IIT ROORKEE	http://em-iitr.vlabs.ac.in/
	COE-PUNE	http://coep.vlab.co.in/?sub=33&brch=95
	IIT MADRAS	http://iitm.vlab.co.in/?sub=46&brch=144
	IIT-GUWAHATI	http://vem-iitg.vlabs.ac.in/
	AMRITA UNIVERSITY	http://vlab.amrita.edu/?sub=1&brch=75

VIRTUAL POWER ELECTRONICS LABS:

	IIT DELHI	http://iitd.vlab.co.in/?sub=67&brch=185
	IIT BOMBAY	http://iitb.vlab.co.in/?sub=44&brch=141
	IIT KHARAGPUR	http://basicelectronics.iitkgp.ernet.in/
	NIT KARNATAKA	http://ied-nitk.vlabs.ac.in/

	IIT KHARAGPUR	http://vlabs.iitkgp.ernet.in/be/
	IIT MADRAS	http://iitm.vlab.co.in/?sub=46&brch=144
	DAYALBAGH EDUCATIONAL INSTITUTE (D.E.I.)	http://vp-dei.vlabs.ac.in/Dreamweaver/

VIRTUAL CONTROL SYSTEM LABS:

	IIT-GUWAHATI	http://iitg.vlab.co.in/?sub=61&brch=174
	IIT MADRAS	http://iitm.vlab.co.in/?sub=46&brch=144
	COE-PUNE	http://em-coep.vlabs.ac.in/
	IIT-GUWAHATI	http://iitg.vlab.co.in/?sub=59&brch=163
	NIT KARNATAKA	http://sa-nitk.vlabs.ac.in/

Students Achievements/Activities

Second year

*Name :*T.Sourabi Krishna *Class :* 2nd year EEE

Event : photography - 3rd prize

*College :*Tamilnadu College of Engineering, Coimbatore *Date* : 19.09.2016

Second Year

Co-curricular Activities

S.NO	NAME	VENUE	EVENT NAME	DATE
1.	A. Nithyashree	St. John's College, Tirunelveli	Display of Air Force Publicity Bus Disha Cell	30-11-2016
2.	M. AnjuAbinaya			
3.	Ranjith Kumar			
4.	Jayakumar			
5.	K. Vishnu Priya	National Engineering College, Kovilpatti	NCC Training Program	30-11-2016
6.	M. Sugasini			
7.	B. Uma			
8.	P. Kavitha			
9.	K. Seetha			
10.	K.R. Jeniba			
11.	K.N Sakthi			
12.	A. Aasha			
13.	K. Sethana Devi			

S.NO	NAME			
14.	B. Radha			
15.	V. Padmavathi			
16.	M. Muthuvaratha Lakshmi			
17.	M. Nandhini			
18.	MahaSwetha			
19.	S. Lakshmi Brindha			
20.	R. Nishanthi			
21.	T. Kayalvizhi			
22.	S. Priyadharshni			
23.	S. Sivakumar	National Engineering College, Kovilpatti	State Level Chess Competition Volunteer	30-12-2016

Third Year

Co-curricular Activities

S.NO	NAME	VENUE	EVENT NAME	DATE
1.	R. Ajith	St. John's College, Tirunelveli	Display of Air Force Publicity Bus Disha Cell	30-11-2016
2.	K. Vinoth Kumar			
3.	R.K. Rajkumar			
4.	Muniskumar			
5.	Saravana Kumar			
6.	R.K. Rajkumar	National Engineering College, Kovilpatti	State Level Chess Competition Volunteer	30-12-2016

Final Year

Co-curricular Activities

S.NO	NAME	VENUE	ACTIVITY	DATE
1	S. Duraipandian	Kayathar	Project Work	25-11-2016
2	K. Kannan			
3.	S. Mohamed Suber			

S.NO	NAME	NATURE OF THE CAMP	PLACE	DATE
1	A. AmalaAani	NCC camp	ST.JOHNS COLLEGE, TIRUNELVELI	26-12-2016 to 02-01-2017
2	A. Primika			
3.	R.M. Vishnu			

TECHNICAL ARTICLE BY STAFF MEMBER

SPEEDCONTROL OF BRUSHLESS DC MOTOR

MS.E.ANITHA

Assistant Professor

Department of Electrical and Electronics Engineering

ABSTRACT

Brushless Dc motor is popular in wide variety of applications. The usage of BLDC motor enhances various performance factors ranging from higher efficiency, higher torque in low-speed range, high power density, low maintenance and less noise than other conventional motors. BLDC uses an electronic commutator rather than mechanical commutator, so it is more reliable than the DC motor. A BLDC motor has same torque-speed characteristic as a conventional dc motor even though the principle of operation is more complex. BLDC motors are commonly used in applications which require higher reliability and efficiency. In this thesis, a mathematical model of the brushless DC motor is developed. The various parameters are analysed by simulating the model in MATLAB(Simulink) software package. The speed control of brushless DC motor is achieved by designing a PID controller .The simulation speed control of brushless DC motor is analysed under various load conditions. Further, for the digital speed control, a discrete PID controller is designed and the response is observed.

PMBLDC MOTORS

PMSMs having trapezoidal back emf are known as PM brushless dc machines (PMBLDCM). Introducing permanent magnets to replace the electromagnetic poles with windings and the replacement of mechanical commutator with an electronic commutator with the advent of power electronic switches led to the development of PMBLDC machines.

The armature of the dc machine need not be on the rotor if mechanical commutator is replaced with the electronic commutator. Thus the armature of the machine can be on the stator enabling better cooling. The excitation poles that to be on the stator shifted to the rotor with the permanent magnet poles. These machines are "an inside out dc machine" with the field and armature interchanged from the conventional dc machine.

COMMUTATION BASED ON HALL SIGNALS

To achieve the commutation of the current in the phase of a machine, the beginning and end of the constant portions of the induced emf have to be tracked. That amounts to only six discrete positions for a three phase machine in each of the electrical cycle. These signals can be generated using three hall sensors displaced from each other by 120º electrical. The hall sensors are arranged in such a way to track the absolute position of the rotor magnets and hence the shape and position of the induced emfs' in all the machine phases. The PMBLDCM requires only six discrete rotor positions for a three phase machine resulting in a low cost feedback sensor.

PRINCIPLE OF OPERATION

In a PMBLDCM, the stator windings are switched with dc current or voltage through a 3Ø inverter. The inverter switching pattern and frequency are controlled by the rotor position and speed. Each switching pattern remains constant for 60º (electrical) rotation of the rotor. Here the phase currents lag behind the applied voltages.

Assumingthe inductance effect to be less dominant, the switching result in a stator mmf pattern which remains stationary for 60º electrical rotation of the rotor. The stator mmf may rotate in clock wise or anticlockwise direction, in discrete steps of 60º. The shifting stator mmf pulls with it the polarized rotor. The rotor experiences an average unidirectional torque in addition to the pulsating component. When the inductance effect is considered, the stator mmf moves to same position with some delay.

As the stator windings need to be synchronized with the rotor position, it is necessary to sense the rotor position and feed these signals to the inverter switching logic circuitry. The inverter switching'sare spaced equally in rotor sweep angle. Thus PMBLDCM is a PM stepper motor operating with rotor position feedback. The synchronized stator switching's lead to more or less same mmf pattern to both poles of rotor all the time as in conventional dc machine.

When the rotor speed increases, there is an increase in the induced emf which will reduce the stator current. This will result in a reduced torque and a situation is reached where the developed torque will be equal to the load torque plus frictional torque. At this point the motor speed reaches a steady state value with slight fluctuations about the mean speed due to the pulsating

nature of the torque.

After reaching the steady state speed, the increase in the dc voltage will result in an increased current. Thus the motor develops an extra torque which will accelerate the rotor until a new speed is reached. The back emf increases and current falls to new value where torque reaches equilibrium. Thus it is found that the speed of the motor can be increased by increasing the dc input voltage to the inverter. Hence the combination of an auto synchronized inverter and an synchronous motor will be exactly equivalent in behaviour of the dc motor but without the commutator, slip ring or brushes.

SPEED CONTROL

Speed control of BLDC motor is based on the commutation logic generated based on the hall sensor signals. The speed from the rotor sensor is obtained from one of the hall signals. The logic is downloaded to the FPGA Board. The actual speed obtained from the hall signal is compared with the reference speed and the error is given to the controller. The reference current from the controller is multiplied with the commutation logic and it gives the reference current. The actual current from the motor is compared with the reference current and the error drives the hysteresis current controller. Based on the actual speed, the inner current loop controls the current. The controlled current provides the respective gating signals for the driver circuit which rotates the rotor to achieve the desired speed. Each dynamic state is modelled using Xilinx System Generator and it is downloaded to the FPGA for the hardware implementation of digital speed control of BLDC motor.

STUDENT ARTICLES

CATERPILLAR TRAIN
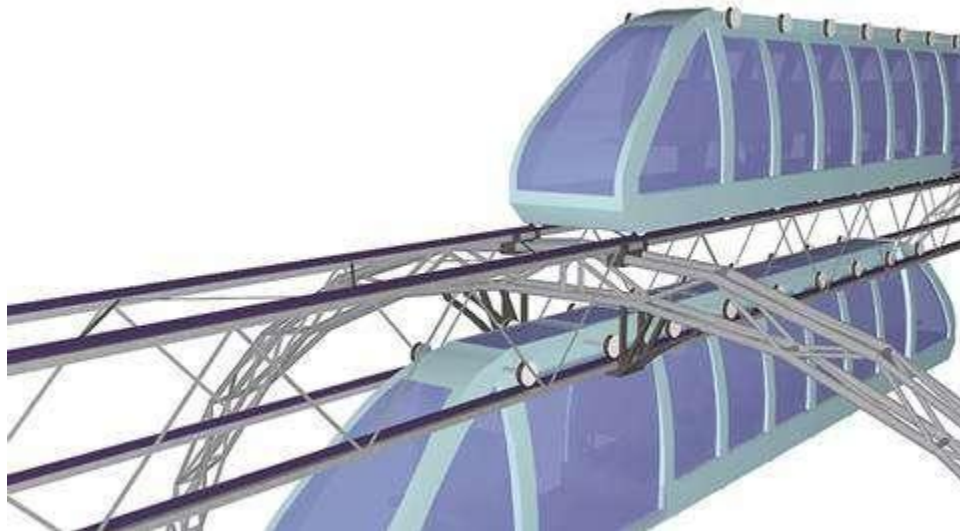
The **Caterpillar Train** or C-**train** is a network of lightweight, elevated **trains** that can run at 100 kms an hour throughout the city. It can reach residential areas with even a five-metreroad.Haryana has taken the lead to set up a pilot corridor for the "Caterpillar Train", a new concept for urban mass-transit solution designed by an AshwaniUpadhyaya.Indian Railway officer which won a global award at the MIT in the United States earlier this year.

Instead of large coaches, the C-Train envisages a series of small, seating-only cars that would be "as high as an SUV" and capable of accommodating 20 passengers at a time. The coaches would have wheels both below and on top, so they can travel on the track and under it — giving it the appearance of a caterpillar. Unlike the conventional metro system, which relies on heavy pillars and corridors, the C-Train would run on poles joined together to form an arch. The system would run on electricity, with each car equipped with a battery in case of emergencies. The traction mechanism is such that both acceleration and deceleration are fast. Since coaches are smaller and lightweight and the poles require little land, the system is capable of penetrating residential areas. Plus, it should cost a fifteenth of a conventional metro system. Each passenger will be able to choose his destination station by clicking on a console in front.

Currently, all urban mass transit systems are developed on the hub-and-spoke concept — the transport system is the hub and users have to travel from various parts of the city and converge there to use it. But the C-Train goes wherever there is at least a five-metre road.

*- **K.Soundarya***

Final year

Digital India

Digitalization would ensure that government services are available to citizens electronically.This programme was launch on 2nd July, 2015 by Prime Minister NarendraModi. This progromme will be implemented in phases till 2018. This programme has been envisaged by Department of Electronics and Information Technology (DEITY) with the active participation of Ministry of Communications and IT, Ministry of Rural Development, Ministry of Human Resource Development and Ministry of Health. Right from the day of its launch, the programme has managed to garner praises from across the different sectors and is considered to play an important role in the transformation of India's digital infrastructure. It will act as a catalyst for the investment in the information technology sector and thus, generate employment. Digital India programmes are centered on three key vision areas: infrastructure as utility to every citizen, Governance and services on demand and digital empowerment of citizens.

Digital infrastructure as a utility to every citizen includes high speed internet as a core utility shall be made available in all Gram Panchayats. Cradle to given digital identity, unique, lifelong, online and authenticable. Mobile phone and bank account would enable participation in

digital and financial space at individual level. Easy access to Common Service Centre within their locality. Shareable private space on a public cloud. Safe and secure cyberspace in the country.

Governance and services on demand includes government services available in real time from online and mobile platforms. All citizen entitlements to be available on the cloud to ensure easy access. Government services digitally transformed for improving ease of doing business. Making financial transactions above a threshold, electronic and cashless, Leveraging Global Information System (GIS) for decision support systems and development.

Digital empowerment of citizens includes universal digital literacy. All digital resources universally accessible. All government documents/certificates to be available on the cloud. Availability of digital resources/services in Indian languages. Collaborative digital platforms for participative governance. Portability of all entitlements for individuals through the cloud.

The overall scope of Digital India is to prepare India for a knowledge future. On being transformative that is to realize IT (India Talent) + IT (Information Technology) is equal to IT (India Tomorrow). Making technology central to enabling change. On being an umbrella programme covering many depai talents. Each individual element stands on its own but it is also part of the larger picture. The weaving together makes the mission transformative in totality. The global investors have applauded the Digital India programme. Many of them have come forward to support this initiative. If the government is successful in implementing the Digital India programme, it will play an important role in the development of economy and stabilising its position in the international market.

- Vigneswari.S

Final year

AIRSELFIE DRONE

Instead of extending your arm or using a selfie stick to snap shots of you and your crew, you could use a new pocket-size drone — dubbed the "AirSelfie" — to help you remotely capture aerial photos and videos.

The AirSelfie is the brainchild of Italian entrepreneur EdoardoStroppiana, who came up with the idea in 2014. The AirSelfie is equipped with a 5-megapixel camera that can shoot full high-definition (HD) 1080p video, as well as a 4GB microSD card. The drone's four rotors help it fly up to 65 feet (20 meters) in the air.

The flying camera measures only about 3.72 by 2.65 by 0.42 inches. The drone uses sonar to measure its altitude and keeps itself stable with the help of a tiny extra camera to monitor its surroundings for signs of jitter.

It is also equipped with gyroscopes, barometers and geomagnetic sensors that help it navigate as it flies. The AirSelfie is controlled via a free iOS or Android app. The app can make the drone take off; adjust its height and direction; let it hover autonomously; and help users take an HD aerial shot or video with just a push of a button.

 Users can also activate a 10-second timer. The drone can take up to eight consecutive shots. The AirSelfie uses Wi-Fi to send photos and videos wirelessly to smartphones.

After snapping photos, the drone can return to its departure point automatically with the touch of a button.A rechargeable lithium polymer battery gives the AirSelfie a flight time of 3 minutes.An accessory known as the Power Bank slips over the AirSelfie and can recharge the drone in 30 minutes. Users can also recharge the AirSelfie directly with a micro-USB cable.

The first preordered drones are scheduled for delivery in March. The drone is expected to hit the market in 2017 for a retail price of $300.

Ramya Jemema.M

Final year

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